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SUN-SPOTS.

By Rose O'Halloran.

Viewed through a four-inch telescope, the surface of the Sun has been as unspotted as untrodden snow for months past.

At length, on the 19th of May, at 11 A.M., a sizable spot in two sections was discerned about twenty degrees inside the northeast limb. In that position some are very distinct, but this had a penumbral aspect, as if the solar atmosphere were very dense. The day following was cloudy; but on the 21st instant, at 9 A.M., in the less foreshortened view, it proved to be a group with three umbræ, one rather large in the foremost section, and two smaller ones in the more easterly section. The adjacent penumbra had commenced to branch northward a few hours afterwards, and on the following morning had developed a distinct umbra, while the two umbræ south of it were transformed into a curving row of five umbræ. On May 23d numerous changes were apparent. The large umbra of the foremost spot was divided, or "bridged," as it is called when a streak of white photospheric matter crosses a dark tract. The new northward umbra of the other section was arching in form, and the last two of the curving row had drifted forward under the three, which in the mean time had united into a dark streak.

The faint penumbral filaments connecting the two divisions had disappeared, and each of the separated tracts had well-defined breaks crosswise where there seemed to be no penumbral matter. The best measurement of position was obtained on the 24th instant, at 11 A.M., as the group was near the center of the disc, and the solar axis corresponded with the meridian. The entire group, which was fully 72,000 miles in length, and elongated in a nearly east-and-west direction, was about eight degrees north of the solar equator.

The foremost umbra was again bridged, the other umbræ were so altered as to form and position as to be scarcely identifiable, and a general shrinkage had evidently set in. On the 25th and 26th instants it was seen only imperfectly through a layer of cloud. On May 27th, 9:45 A.M., the foremost umbra had undergone some changes, as if a part had drifted in advance, and instead of being elongated north and south, it extended in an

east-and-west direction. This umbra was in three distinct parts at 11:30 A.M. on May 28th, and the entire formation seemed to be still diminishing.

The general outlines seemed unchanged at 1 P.M. May 29th, but the division in the larger umbra was undiscernible, perhaps on account of the foreshortened view and the solar atmosphere. On May 30th the outlines were still visible near the limbs, but on the 31st it had passed from view. At the present stage of sun-spot minimum the details of a group of more than average size have especial interest, as the known irregularities of the cycle make it possible that they may be the initial footprints of a returning maximum.

SAN FRANCISCO, May 31, 1901.

FLUCTUATIONS OF *NOVA PERSEI.*

BY ROSE O'HALLORAN.

Nova Persei was observed on about fifty clear evenings between 7:30 and 9:00, P. S. T., commencing on February 24th, and ending in the beginning of May. During this period its decline from 1st magnitude to 6.5 was interrupted by nine temporary revivals of light, which were estimated as follows, with the aid of the charts published by Father HAGEN:—

Between February 28th and March 2d, from 2.1 to 1.9 mag.
Between March 11th and 12th, from 3.3 to 3.1 mag.
Between March 20th and 27th one or two fluctuations were noticed, but not having been recorded at the time of observation, the amount of increase or the dates could not be recalled accurately.
Between April 7th and 8th, from 5.2 to 4.6 mag.
Between April 10th and 12th, from 5.4 to 4.6 mag.
Between April 16th and 18th, from 5.6 to 4.2 mag.
Between April 22d and 23d, from 6.5 to 4.0 mag.
Between April 26th and 27th, from 6.0 to 4.5 mag.
Between April 27th and May 6th, from 6.0 to 4.0 mag.

This last estimate of increase was unsatisfactory on account of the interference of high buildings, which hindered further observation afterwards. The intervals in which fluctuations